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red fibrous bark; bark of the branches flaking off in thin plates and leaving a smooth surface; branchlets stout and rather rigid, sharply quadrangular; leaves closely imbricated, very glaucous, neither pitted nor glandular; their margins entire, or, in the very oldest, denticulate; cones crowded on short, stout peduncles, globose, about an inch in diameter, of 6-8 very thick, and strongly bossed scales; seeds numerous, 2 lines or more wide.

This fine cypress was discovered by the writer on the mountains back of Clifton, in the extreme eastern part of Arizona, on the first day of September, 1880.

Abundant specimens of wood, and fruiting branches were secured, and soon distributed, under the above name, to the principal herbaria of this country, and several in Europe, including that of the Royal Gardens at Kew.

In the course of the year and a half that has since intervened, the species has been collected at different points in the southern and eastern portions of the same Territory, by Messrs. Rusby, Pringle and Lemmon. The tree is peculiar in that, while the bark of its trunk is as shreddy as that of any cedar, that of the branches, even the larger ones, is scaly, falling off in thin plates. The wood is light and straight grained, splitting with the utmost readiness; that of the heart being dark red, resembling that of red cedar. The branchlets bear so strong a likeness to those of *Juniperus pachyphloea*, Torr., that without fruit they are hardly distinguishable. It is the principal tree of the mountains which lie to the north of Mt. Graham, and forms dense forests, particularly on the northward slopes.

Notes on New England Algae.

By W. G. FARLOW.

Since the appearance of my paper on New England Algae, I have received a number of interesting species, new to our coast, from Mr. F. S. Collins of Malden, Mass., and Rev. J. D. King, of Edgartown, Martha's Vineyard. In 1881 Mr. Collins sent a specimen, collected near Little Nahant, which resembled a small *Asperococcus*, and which could not at the time be determined. In March of this year he succeeded in finding a considerable number of specimens of the same species in excellent condition, and, through his kindness, I have been enabled to examine both living and dried specimens. The alga in question is of a decided olive-brown color when fresh, and becomes somewhat greenish in pressing, in this respect resembling some of the *Asperococci* and *Punctariae*. The frond is tubular, and resembles strongly the species of *Asperococcus* in habit, but even in its adult condition it is composed of a single layer of cells, which are generally associated in fours and are of a gelatinous texture. Were it not for the distinctly brown color, one would be inclined to consider the plant as a species of *Prasiola*, especially if examined after having been dried. There can be no doubt, however, that it belongs to the *Phaeosporae*, and it appears to me to constitute a new genus (*Phaeosaccion*) of that suborder, differing from other genera in having its tubular frond composed of a single layer of rather

gelatinous cells. The genus must be regarded as one of the lowest of the suborder, simpler even than *Scytosiphon*, where there is more than one layer of cells, and where the surface is covered with plurilocular sporangia and hairs. In *Phaeosaccion* one sees the relationship of the *Phaeosporeae* to the *Florideae* in their lowest representatives, the *Porphyrae*, and, on the other hand, to the *Chlorosporeae* in the genus *Prasiola*. The fronds of *Phaeosaccion Collinsii* are generally gregarious, and start from a common mass of cells, any of which may grow into a short filament composed of a single row of cells. By a longitudinal division of all except the terminal cell, a frond is formed consisting of two rows of cells ending in a single apical cell. By subsequent transverse and radial divisions, a tubular or saccate frond is formed, composed of a single thickness of cells. The division of the cells into fours is tolerably regular, and, when the plant matures from each ultimate division, there is formed, as far as could be ascertained, a single zoospore which escapes and leaves behind the colorless cell-walls. Only a small number of the specimens examined by me had produced zoospores; and these, at the time of examination, had come to rest, so that it was impossible to tell anything about the number of cilia. On this point further examination is necessary. The genus may be provisionally characterized as follows:

PHAEOSACCION, Farlow.

Fronds olive-brown, tubular, or saccate, composed of a single layer of cells disposed in fours. Hairs wanting. Reproduction by zoospores produced singly (?) in each cell. Cilia?

PHAEOSACCION COLLINSII, Farlow.—Fronds subgelatinous, gregarious, compressed-cylindrical, $\frac{1}{8}$ inch to 1 inch broad, about 2–8 inches long, at first saccate, becoming cylindrical, apex at length ruptured. Cells squarish, 3.8μ – 7μ broad; frond 8μ – 10μ in thickness. On *Zostera*. Little Nahant, Mass., in early spring. Mr. F. S. Collins.

Among the plants received from Rev. Mr. King were fine specimens of *Striaria attenuata*, some of them a foot long. They were washed ashore at Edgartown in January, and Mr. King supposes them to have grown at the mouth of Edgartown Harbor. Some of the specimens perfectly resemble European specimens of the species, and bear the well-known unilocular sporangia in abundance. Some of the specimens, however, are small and slender, and the surface of the branches is covered with plurilocular sporangia, which I believe have never before been seen. The plants bearing the plurilocular sporangia resemble those bearing the unilocular, in microscopic structure, although, as before said, their habit is much more slender; they are, however, solid and not hollow, as is the case with the large specimens, but in its young stage *Striaria* has a solid frond. Were it not that one of the unilocular-bearing specimens sent by Mr. King was as small and slender as those bearing plurilocular sporangia, I should have hesitated to consider the specimens as all belonging to the same species. The unilocular sporangia, which resemble those of *Punctaria*, are found scattered over the larger branches, and sometimes also on the smaller polysiphonous branch-

lets which end in the hairs characteristic of the trichothallic growth of *Striaria*. They arise from the cortical cells, which divide irregularly, and increase in size so that they project in well-marked papillae, above the surface. The general shape of the sporangia is ovoid, but, when several contiguous cells are transformed into sporangia, they become cuboidal or prismatic by pressure. Judging from Mr. King's specimens, the plurilocular plant of *Striaria* is smaller, finer, and less fully developed as to the frond, than the unilocular plant. Whether the plant which bears plurilocular sporangia continues to grow, and afterwards produces unilocular sporangia, I have no means of determining, but such is apparently not the case.

Another interesting plant sent by Mr. King, but only in a very small quantity, is closely related to *Capsicarpella speciosa*, Kjellm., a species afterwards removed from *Ectocarpeae* by Kjellman (Algenvegetation des Murmanschen Meeres, p. 29), who believes that the unilocular sporangia contain a single spore, and not numerous zoospores, and consequently places the species, with one other, in a new genus *Scaphospora*, under the *Tilopterideae*. I have examined one microscopic preparation and one pressed specimen sent by Mr. King, and in both there are unilocular and plurilocular sporangia, which, in general, resemble Kjellman's figure of *C. speciosa* (Bid. Skand. Ectocarp. och Tilopter, pl. i, fig. 3), but which are smaller than the measurements given by Kjellman. Our species more nearly resembles, as far as measurements go, *Sc. arctica*, Kjellm., but is apparently smaller. The species may be provisionally described as new, although farther comparison may show it to be a form of one of the two species mentioned. Furthermore, although in as good condition as is usually the case with mounted specimens of this group of algae, it is impossible to say whether the contents of the unilocular sporangia form a single spore or are going to divide into numerous zoospores. Assuming the former to be true, our plant would come under *Scaphospora*, and is the only representative of the *Tilopterideae* yet found on our coast.

SCAPHOSPORA (?) KINGII, Farlow.—Main filaments 4 inches long, loosely and irregularly branching, cells 70μ – 75μ broad, usually shorter than broad, secondary branches short, revolute, beset with numerous secund, pectinately-compound branchlets, which end in long hairs. Unilocular sporangia borne on the penultimate branchlets, compressed-globose, 45μ – 58μ in diameter, solitary, produced by the division of a branch-cell into two parts. Plurilocular sporangia borne on the ultimate branchlets, 35μ – 40μ broad, 75μ – 150μ long.

Washed ashore at Edgartown, Mass. Rev. J. D. King, January, 1882.

In the month of August, 1881, I collected at Wood's Holl, Mass., a *Gloeocapsa*, which, at the time, was growing in considerable quantity on the eel-grass, but which soon disappeared. I had seen it occasionally in previous years, but never before in condition to describe. Its color is almost precisely that of living diatoms, for which it might pass in the masses of slime in which it generally occurs.

GLOEOCAPSA ZOSTERICOLA, Farlow.—Forming shapeless, gelatinous, brownish masses. Cells flattened-hemispherical, concave on the inner surface, about 19μ – 26μ long by 9μ – 11μ broad, united in twos or fours into colonies of from 40μ – 100μ in diameter, with numerous distinct, enveloping layers.

On *Zostera*, mixed with *Calothrix*, etc. Wood's Holl, Mass., August, 1881.

In my paper on New England Algae, I stated that *Callithamnion versicolor* was known in this country only in its seiosporic condition. Last summer I found specimens at Wood's Holl which showed true favellae and tetraspores also, as are recorded in Europe by Bornet in *Études Phycologiques*, p. 71. A specimen of *Callithamnion Plumula*, collected at Gay Head in September, is of interest as showing antheridia, with regard to which little seems to be known in the sub-genus *Antithamnion*. The antheridia are in oblong tufts formed by the transformation of the ultimate second branchlets, and remind one of Harvey's figure of *Callithamnion polyspermum*, Phyc. Britt., pl. 231, fig. 6.

Fern Notes. IV.

By GEO. E. DAVENPORT.

Aspidium trifoliatum, Swartz.—Dr. Engelmann has very kindly favored me with a portion of a specimen of this fine *Aspidium*, which was collected "in the entrance to a limestone cave, on its perpendicular walls, not far from New Braunfels, Texas," in 1878, by the lamented Lindheimer, who was thus the first to collect this species within the limits of the United States.

Botrychium simplex, Hitchcock.—Mr. W. N. Suksdorf, of White Salmon, W. T., sends a fine, compact, very fleshy, ternate form of this species, the whole plant scarcely more than $1\frac{1}{2}$ inches tall, from Mt. Adams.

Mr. Suksdorf has collected some eighteen species of the ferns of Washington Territory, including two extreme forms of *Botrychium ternatum*, the normal form of *Asplenium Trichomanes*, *Cryptogramme acrostichoides*, *Pellaea densa*, *Gymnogramme triangularis* and *Aspidium aculeatum*, var. *scopulinum*; and the specimens which he has sent me are exceedingly fine and well selected. His sets are desirable, and well worth the price at which he advertises them.

Miss Furbish also collected, last season, *B. simplex* in Bridgewater, Aroostook Co., Me., where she reports it as being quite abundant.

Woodsia Plummerae, Lemmon.—Since my notes for the February BULLETIN were prepared, I have received specimens of this fern authenticated by its author's ticket, and my foot-note (*l. c.*, p. 22) requires modification in so far as it seemingly places this fern with *W. Mexicana*; it is rather a very glandular form of *W. obtusa*, but none the less identical with much of the other collections mentioned, and which appear to be considerably mixed. *Woodsia Oregana*, although normally smooth, is sometimes quite glandular (as in some specimens which I have from Dakota), but in *W. obtusa* the normal form itself is often more or less glandular (a character which does